The Metacognitive Demands and Opportunities of Generative AI

Abstract

Generative AI (GenAI) systems offer unprecedented opportunities for transforming professional and personal work, yet present challenges around prompting, evaluating and relying on outputs, and optimizing workflows. We argue that metacognition—the psychological ability to monitor and control one's thoughts and behavior—offers a valuable lens to understand and design for these usability challenges. Drawing on research in psychology and cognitive science, and recent GenAI user studies, we illustrate how GenAI systems impose metacognitive demands on users, requiring a high degree of metacognitive monitoring and control. We propose these demands could be addressed by integrating metacognitive support strategies into GenAI systems, and by designing GenAI systems to reduce their metacognitive demand by targeting explainability and customizability. Metacognition offers a coherent framework for understanding the usability challenges posed by GenAI, and provides novel research and design directions to advance human-AI interaction.